What is claimed is:

1. A vibratory conveying apparatus for conveying material including:

a bed on which the material is conveyed;

a plurality of inclined stabilizers, each said stabilizer having a first end, a second end and a longitudinal axis, said first end of each said stabilizer being attached to said bed;

a first pair of rotatable eccentric weights coupled to said bed; and

a second pair of rotatable eccentric weights coupled to said bed;

whereby rotation of said first pair of rotatable eccentric weights and rotation of said second pair of rotatable eccentric weights cause said bed to vibrate.

2. The vibratory conveying apparatus of claim 1 including a plurality of drive springs, each said drive spring having a first end, a second end and a central axis, said first end of each said drive spring being attached to said bed, said central axes of said drive springs being located generally perpendicular to said longitudinal axes of said stabilizers.

3. The vibratory conveying apparatus of claim 2 including a first pair of vibratory motors, said first pair of rotatable eccentric weights being respectively attached to said first pair of vibratory motors, and a second pair of vibratory motors, said second pair of eccentric weights being respectively attached to said second pair of vibratory motors.

4. The vibratory conveying apparatus of claim 3 wherein said drive springs have a natural frequency of vibration and said vibratory drive motors are adapted to rotate said eccentric weights at an operating speed, said natural frequency of said drive springs being greater than said operating speed of said vibratory motors.

5. The vibratory conveying apparatus of claim 1 wherein said first pair of rotatable eccentric weights and said second pair of rotatable eccentric weights are rotatably attached to said bed.

6. The vibratory conveying apparatus of claim 2 including a counterbalance, said second ends of said drive springs and said second ends of said stabilizers being attached to said counterbalance.

7. The vibratory conveying apparatus of claim 6 including a plurality of isolation springs attached to said counterbalance, said isolation springs adapted to support said counterbalance on a support structure.

8. The vibratory conveying apparatus of claim 6 wherein said first pair of rotatable eccentric weights and said second pair of rotatable eccentric weights are rotatably attached to said counterbalance and are thereby coupled to said bed.

9. The vibratory conveying apparatus of claim 8 including a first pair of vibratory motors attached to said counterbalance, said first pair of rotatable eccentric weights being respectively attached to said first pair of vibratory motors, and a second pair of vibratory motors attached to said counterbalance, said second pair of rotatable eccentric weights being respectively attached to said second pair of vibratory motors.

10. The vibratory conveying apparatus of claim 8 wherein said bed includes an inlet end half and an outlet end half, and a majority of said drive springs are attached to said outlet end half of said bed.

11. The vibratory conveying apparatus of claim 8 wherein said counterbalance includes a plurality of sections.

12. A vibratory conveying apparatus for conveying material including:

a bed on which the material is conveyed;

a counterbalance;

a plurality of stabilizer members, each said stabilizer having a first end attached to said bed, a second end attached to said counterbalance and a longitudinal axis, said longitudinal axes of said stabilizer members being generally parallel to one another;

a first pair of rotatable eccentric weights rotatably attached to said counterbalance; and

a second pair of rotatable eccentric weights rotatably attached to said counterbalance;

whereby rotation of said first pair of rotatable weights and rotation of said second pair of rotatable weights cause said bed to vibrate.

13. The vibratory conveying apparatus of claim 12 including a first pair of vibratory motors attached to said counterbalance, said first pair of vibratory motors respectively rotatably attaching said first pair of rotatable eccentric weights to said counterbalance, and a second pair of vibratory motors attached to said counterbalance, said second pair of vibratory motors respectively rotatably attaching said second pair of rotatable eccentric weights to said counterbalance.

14. The vibratory conveying apparatus of claim12 including a plurality of drive springs, each said drive spring having a first end attached to said bed, a second end attached to said counterbalance, and a central axis, said stabilizer members allowing movement of said bed generally parallel to said central axes of said drive springs and inhibiting movement of said bed generally transversely to said central axes of said drive springs.

15. A method of vibrating a conveying apparatus to convey material including the steps of:

providing a bed having an inlet end and an outlet end on which material is adapted to be conveyed;

providing a plurality of drive springs, each drive spring having a first end attached to said bed and a second end attached to a support;

providing a plurality of pairs of vibratory motors, each vibratory motor having a rotatable eccentric weight, each said vibratory motor adapted to operate at an operating speed;

operating said vibratory motors to rotate said eccentric weights and thereby vibrate said bed at a vibration frequency; and

operating said vibratory motors at a selected operating speed which approaches being equal to, or is less than, the natural frequency of said drive springs which are vibrating said bed.

16. The method of claim 15 including the step of operating said pair of vibratory motors located closest to said outlet end of said bed so as to provide a greater force output than the remainder of said pairs of vibratory motors.

17. The method of claim 15 including the step of adjusting the vibration frequency of said bed by use of an electrical control connected to said vibratory motors.

18. The method of claim 15 including the step of adjusting the operating stroke of said drive springs by use of an electrical control connected to said vibratory motors.